REMARKS

The Office Action dated January 3, 2008, has been carefully reviewed and the forgoing amendment and following remarks have been made in consequence thereof.

Claims 1-3, 6, 7, 9-13, 16, 17, 19-24, 26, and 28-31 are pending in this application. Claims 4, 5, 14, 15, 18, and 25 are canceled. Claims 9, 19, 21-24, 26, 28, and 29 are withdrawn. Claims 1-3, 6, 7, 9-13, 16, 17, 19-24, 26, and 28-31 stand rejected.

Applicants wish to thank Examiner Karlsen for the courtesies he extended in a telephonic interview with William Zychlewicz and Mark McCormick on April 2, 2008, in which the § 132 rejection was discussed. More specifically, particular regard was made to the shape of a magnetic field and how a Hall effect device is configured to sense the shape of a magnetic field. It was agreed that a response to the Office Action dated January 3, 2008 would be the most appropriate response to the outstanding Office Action. No further agreement was reached.

The objection to the drawings and specification under 35 U.S.C. § 132(a) as containing new matter is respectfully traversed. The Office Action asserts that the amendments to Figures 2A and 2B, paragraph [0007], and the newly added paragraphs after paragraph [0011] are not supported by the original disclosure. Applicants respectfully traverse this assertion.

An amendment to the drawings that merely amends the drawings and/or specification to conform to each other is not a violation of 35 U.S.C. 132(a). In re Heinle, 145 USPQ 131, 136 (C.C.P.A. 1965). Furthermore, an amendment to the specification and drawings that merely clarifies that which the originally-filed application inherently disclosed, for example, the underlying theory of the invention, does not add "new matter" to the application. See Triax Co. v. Hartman Metal Fab., 178 USPQ 142, 146 (2d Cir. 1973); Technicon Instr. Corp. v. Coleman Instr. Inc., 150 USPQ 227, 236 (N.D. Ill. 1966). Applicants respectfully submit that the amendment to the specification and drawings merely clarifies what was inherently disclosed in the originally-filed application by amending the specification and drawings to conform to each other and to merely describe in more detail the underlying theory of the originally-disclosed invention.

Applicants respectfully traverse the assertion in the Office Action that "[a]ll of the proposed changes to the specification and drawings is considered to introduce new matter." Applicants respectfully request that the new matter be explicitly pointed to rather than a conclusory statement that all the changes introduce new matter. Applicants respectfully submit that no mew matter has been added and that the changes to the drawings and the specification are merely an attempt to explain magnetic field theory in more detail for the benefit of the examiner.

Regarding Figure 2B, Applicants respectfully submit that Figures 1 and 2 and the specification of the originally-filed application support the amendment of Figure 2B because Figure 2B is a combination of Figures 1 and 2 (now Figure 2A) to clarify the theory that inherently underlies the originally-disclosed invention. Figure 1 as originally filed shows a pair of Hall effect devices (12) having a magnetic field (B) associated therewith such that magnetic field directions oppose each other. Paragraph [0013] of the originally-filed specification describes that the magnetic field (B) is substantially perpendicular to the Hall effect device (12) and that a first magnetic field direction opposes a second direction of the magnetic field. The first direction passes through one of the Hall effect devices (12) and the second direction passes through the other Hall effect device (12). Further, Figure 2 (now Figure 2A) as originally filed shows a cross-section of the conductor (16) including a magnetic field generated by current through the conductor (16), wherein the magnetic field has opposing directions that each pass through a slot (32) defined through the conductor (16).

Paragraphs [0011] and [0012] of the originally-filed specification describe that the opposing magnetic field directions are generated by the current and pass through the slot. In originally-filed paragraph [0012], the Hall effect devices (12) (shown in originally-filed Figure 1) are described as being disposed within the slot (32) (shown in originally-filed Figure 2) in the conductor (16) where the magnetic field (B) has a pre-determined spatial behavior. According to the description in Paragraph [0012], the Hall effect devices (12) as shown in Figure 1, are combined with the conductor (16) shown in Figure 2, such that the magnetic field directions in Figure 1 correspond to the magnetic field directions in Figure 2, to result in Figure 2B, as amended.

Moreover, Figure 2B illustrates inherent properties of a magnetic field generated by a conductor, and the amendment to the specification merely adds more detail about the

originally-disclosed invention by describing inherent properties of the invention, such as, the properties of a magnetic field and the scientific theory underlying the originally-disclosed invention. Consequently, the originally-filed drawings and specification inherently and expressly provide adequate support for the amendment to the specification and Figure 2. Accordingly, Applicants respectfully submit that the amendment to the specification and drawings is not a violation of 35 U.S.C. 132(a).

Figure 4 is block diagram of a Hall effect based electronic electricity meter. Figure 4 has been revised in a previous amendment to remove stray markings and darken other lines that showed up lightly in the originally submitted drawing. As such no new matter was added to Figure 4.

For at least the reasons set forth above and having provided support for the features noted in the Office Action, Applicants respectfully request that the objection to the drawings and specification under 35 U.S.C. § 132(a) be withdrawn.

The rejection of Claims 1-3, 6, 7, 10-13, 16, 17, 20, 30 and 31 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement is respectfully traversed.

The Office Action asserts at page 6 that "[t]he is no original disclosure for the Hall effect devices being aligned substantially perpendicular to the longitudinal axis of the conductor or that the conductor will produce predetermined lines of lines of forces." Applicants respectfully traverse this assertion, and submit that such a limitation does have basis in the originally-filed specification and drawings for at least the reasons discussed regarding the rejection under Section 132. The rejected limitation is described in the amendment to the specification and drawings. As discussed above, the amendment to the drawings and specification merely clarifies that which was inherent in the originally-filed disclosure and does not violate the "new matter" rule. As such, the claims, as amended, are supported by the originally-filed specification and drawings because the limitation that the Hall effect devices are aligned substantially perpendicularly to a longitudinal axis of the conductor and in the same plane as the conductor portions on either side of the aperture is an inherent property of the originally-disclosed invention. Furthermore, the claims, as amended, have removed the term "predetermined lines of force" and the limitation, as amended in the

claims, the conductor configured to generate the magnetic field when an electrical current is flowing through the conductor is an inherent property of the originally-disclosed invention.

For at least the reasons set forth above, Applicants respectfully request that the Section 112, first paragraph rejection of Claims 1-3, 6, 7, 10-13, 16, 17, 20, 30 and 31 be withdrawn

The rejection of Claims 1-3, 6, 7, 10-13, 16, 17, 20, 30 and 31 under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement is respectfully traversed.

The Office Action asserts at page 6 that "[i]t is not clear how each of the Hall effect devices can produce first and second outputs which can be combined so that the second output is reduced." Applicants respectfully traverse this assertion, and submit that such a limitation does have basis in the originally-filed specification and drawings for at least the reasons discussed regarding the rejection under Section 132. The rejected limitation is described in the amendment to the specification and drawings. As discussed above, the amendment to the drawings and specification merely clarifies that which was inherent in the originally-filed disclosure and does not violate the "new matter" rule. As such, the claims, as amended, are supported by the originally-filed specification and drawings because the limitation that a current sensor configured to combine the outputs of each said Hall effect device such that the output based on the ambient magnetic field is reduced is an inherent property of the originally-disclosed invention.

Accordingly, Applicants submit that one skilled in the art, after reading the specification, would understand the recitations of the presently pending claims.

For at least the reasons set forth above, Applicants respectfully submit that Claims 1-3, 6, 7, 10-13, 16, 17, 20, 30 and 31 satisfy Section 112, first paragraph.

The rejection of Claims 1-3, 6, 7, 10-13, 16, 17, 20, 30, and 31 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent 6,040,690 to Ladds (hereinafter referred to as "Ladds") is respectfully traversed.

Ladds describes an electricity measurement apparatus that includes two spaced-apart parallel conductors through which current flows in the same direction inducing a magnetic

field between the conductors. Two magnetic field sensors are disposed on each side of a first plane in which the conductors lie. The sensors are in a second plane that is substantially between the conductors and perpendicular to the first plane. An arithmetic processor processes signals from the sensors to provide a value representative of current flow. The provided value is substantially independent of the position of the second plane within the space between the conductors.

Claim 1 recites a current sensor for an apparatus, said current sensor comprising a conductor comprising "a longitudinal axis, said conductor further comprising an aperture therethrough, said aperture comprising a length substantially aligned with respect to said longitudinal axis, and said aperture comprising a width aligned perpendicularly with respect to said longitudinal axis, said length is greater than said width, said conductor comprises a first and a second portion, said first and second portions comprising a cross section comprising a length and the height, the length being greater than the height; and a plurality of Hall effect devices inserted at least partially within said aperture, and said plurality of Hall effect devices aligned substantially perpendicularly to the longitudinal axis, and in the same plane as the first and second conductor portions on either side of the aperture, wherein said conductor is configured to generate a magnetic field when an electrical current is flowing through said conductor, each said Hall effect device configured to generate an output based on said generated magnetic field and an ambient magnetic field, said current sensor configured to combine the outputs of each said Hall effect device such that the output based on the ambient magnetic field is reduced."

Ladds does not describe nor suggest a current sensor as is recited in Claim 1. Specifically, Ladds does not describe nor suggest a current sensor including a conductor including a longitudinal axis, said conductor further comprising an aperture therethrough, said aperture comprising a length substantially aligned with respect to said longitudinal axis, and said aperture comprising a width aligned perpendicularly with respect to said longitudinal axis, said length is greater than said width, said conductor comprises a first and a second portion, said first and second portions comprising a cross section comprising a length and the height, the length being greater than the height; and a plurality of Hall effect devices inserted at least partially within said aperture. Moreover, Ladds does not describe or suggest a current sensor including Hall effect devices configured to generate an output based on said generated magnetic field and an ambient magnetic field, said current sensor configured to combine the

outputs of each said Hall effect device such that the output based on the ambient magnetic field is reduced. Rather, Ladds describes two magnetic field sensors disposed on each side of a first plane in which the conductors lie, wherein the sensors are in a second plane that is substantially between the conductors and perpendicular to the first plane. Additionally, Ladds describes conductor portions that are substantially equal in height and width, in contrast to the present invention. Accordingly, for at least the reasons set forth above, Claim 1 is submitted to be patentable over Ladds.

Claims 2, 3, 6, 7, 30, and 31 depend from independent Claim 1. When the recitations of Claims 2, 3, 6, 7, 30, and 31 are considered in combination with the recitations of Claim 1, Applicants submit that dependent Claims 2, 3, 6, 7, 30, and 31 likewise are patentable over Ladds.

Claim 10 recites a current sensor for an apparatus comprising "a conductor comprising a longitudinal axis, said conductor further comprising an aperture therethrough, said aperture comprising a length substantially aligned with respect to said longitudinal axis, and said aperture comprising a width aligned perpendicularly with respect to said longitudinal axis, said length is greater than said width, said conductor comprises a first and a second portion, said first and second portions comprising a cross section comprising a length and the height, the length being greater than the height; and a plurality of Hall effect devices inserted at least partially within said aperture, and said plurality of Hall effect devices aligned substantially perpendicularly to the longitudinal axis, and in the same plane as the first and second conductor portions on either side of the aperture, wherein said conductor is configured to generate a magnetic field said conductor is configured to generate a magnetic field comprising at least a first magnetic field component having a first direction and a second magnetic field component having a second direction different from said first direction, and when an electrical current is flowing through said conductor, each said Hall effect device configured to detect said generated magnetic field and generate an output based on said generated magnetic field and an ambient magnetic field, said current sensor configured to combine the outputs of each said Hall effect device such that the output based on the ambient magnetic field is reduced."

Ladds does not describe nor suggest a current sensor as recited in Claim 10. Specifically, Ladds does not describe nor suggest a current sensor including a conductor

including a longitudinal axis, said conductor further comprising an aperture therethrough, said aperture comprising a length substantially aligned with respect to said longitudinal axis, and said aperture comprising a width aligned perpendicularly with respect to said longitudinal axis, said length is greater than said width, said conductor comprises a first and a second portion, said first and second portions comprising a cross section comprising a length and the height, the length being greater than the height. Moreover, Ladds does not describe or suggest a current sensor including Hall effect devices configured to detect said generated magnetic field and generate an output based on said generated magnetic field and an ambient magnetic field, said current sensor configured to combine the outputs of each said Hall effect device such that the output based on the ambient magnetic field is reduced. Rather, Ladds describes two magnetic field sensors disposed on each side of a first plane in which the conductors lie, wherein the sensors are in a second plane that is substantially between the conductors and perpendicular to the first plane. Moreover, In contrast to the present invention, Ladds describes conductor portions that are substantially equal in height and width. Accordingly, for at least the reasons set forth above, Claim 10 is submitted to be patentable over Ladds.

Claim 11 recites a residential electricity meter comprising "a voltage sensor and a current sensor, said current sensor comprising a conductor comprising a longitudinal axis, said conductor further comprising an aperture therethrough, said aperture comprising a length substantially aligned with respect to said longitudinal axis, and said aperture comprising a width aligned perpendicularly with respect to said longitudinal axis, said length is greater than said width, said conductor comprises a first and a second portion, said first and second portions comprising a cross section comprising a length and the height, the length being greater than the height; and a plurality of Hall effect devices inserted at least partially within said aperture, and said plurality of Hall effect devices aligned substantially perpendicularly to the longitudinal axis, and in the same plane as the first and second conductor portions on either side of the aperture, wherein said conductor is configured to generate a magnetic field when an electrical current is flowing through said conductor, each said Hall effect device configured to detect said generated magnetic field and generate an output based on said generated magnetic field and an ambient magnetic field, said current sensor configured to combine the outputs of each said Hall effect device such that the output based on the ambient magnetic field is reduced."

Ladds does not describe nor suggest a residential electricity meter as recited in Claim 11. Specifically, Ladds does not describe nor suggest a current sensor including a conductor including a longitudinal axis, said conductor further comprising an aperture therethrough, said aperture comprising a length substantially aligned with respect to said longitudinal axis, and said aperture comprising a width aligned perpendicularly with respect to said longitudinal axis, said length is greater than said width, said conductor comprises a first and a second portion, said first and second portions comprising a cross section comprising a length and the height, the length being greater than the height. Further, Ladds does not describe nor suggest a current sensor including Hall effect devices configured to detect said generated magnetic field and generate an output based on said generated magnetic field and an ambient magnetic field, said current sensor configured to combine the outputs of each said Hall effect device such that the output based on the ambient magnetic field is reduced. Rather, Ladds describes two magnetic field sensors disposed on each side of a first plane in which the conductors lie, wherein the sensors are in a second plane that is substantially between the conductors and perpendicular to the first plane. Moreover, In contrast to the present invention, Ladds describes conductor portions that are substantially equal in height and width. Accordingly, for at least the reasons set forth above, Claim 11 is submitted to be patentable over Ladds.

Claims 12, 13, 16, and 17 depend from independent Claim 11. When the recitations of Claims 12, 13, 16, and 17 are considered in combination with the recitations of Claim 11, Applicants submit that dependent Claims 12, 13, 16, and 17 likewise are patentable over Ladds.

Claim 20 recites a residential electricity meter comprising "a voltage sensor and a current sensor, said current sensor comprising a conductor comprising a longitudinal axis, said conductor further comprising an aperture therethrough, said aperture comprising a length substantially aligned with respect to said longitudinal axis, and said aperture comprising a width aligned perpendicularly with respect to said longitudinal axis, said length is greater than said width, said conductor comprises a first and a second portion, said first and second portions comprising a cross section comprising a length and the height, the length being greater than the height; and a plurality of Hall effect devices inserted at least partially within said aperture, and said plurality of Hall effect devices aligned substantially perpendicularly to the longitudinal axis, and in the same plane as the first and second conductor portions on either side of the aperture, wherein said conductor is configured to generate a magnetic field

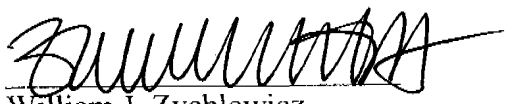
at least a first direction and a second magnetic field component having a second direction different from said first direction, and when an electrical current is flowing through said conductor; each said Hall effect device configured to detect said generated magnetic field and generate an output based on said generated magnetic field and an ambient magnetic field, said current sensor configured to combine the outputs of each said Hall effect device such that the output based on the ambient magnetic field is reduced."

Ladds does not describe nor suggest a residential electricity meter as recited in Claim 20. Specifically, Ladds does not describe nor suggest a current sensor including a conductor including a longitudinal axis, said conductor further comprising an aperture therethrough, said aperture comprising a length substantially aligned with respect to said longitudinal axis, and said aperture comprising a width aligned perpendicularly with respect to said longitudinal axis, said length is greater than said width, said conductor comprises a first and a second portion, said first and second portions comprising a cross section comprising a length and the height, the length being greater than the height. Further, Ladds does not describe nor suggest a current sensor including Hall effect devices configured to detect said generated magnetic field and generate an output based on said generated magnetic field and an ambient magnetic field, said current sensor configured to combine the outputs of each said Hall effect device such that the output based on the ambient magnetic field is reduced. Rather, Ladds describes two magnetic field sensors disposed on each side of a first plane in which the conductors lie, wherein the sensors are in a second plane that is substantially between the conductors and perpendicular to the first plane. Moreover, In contrast to the present invention, Ladds describes conductor portions that are substantially equal in height and width. Accordingly, for at least the reasons set forth above, Claim 20 is submitted to be patentable over Ladds.

For at least the reasons set forth above, Applicants respectfully request that the Section 102 rejection of Claims 1-3, 6, 7, 10-13, 16, 17, 20, 30, and 31 be withdrawn.

In view of the foregoing amendment and remarks, all the claims now active in this application are believed to be in condition for allowance. Reconsideration and favorable action is respectfully requested.

Respectfully Submitted,



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